John W. THOMSON*: *Cladonia asahinae* sp. nov. from western North America**

J. W. タムソン*: 北米西部に分布するハナゴケ属の1新種 *Cladonia asahinae***

In recent years a number of studies of lichens in the *Cladonia chlorophaea* group have appeared (Ahti, 1966; Asahina, 1940; Bowler, 1972; Culberson, C. F. & Kristinsson, 1969; Kristinsson, 1971, 1974; Leuckert & Poelt, 1970; Leuckert, Ziegler & Poelt, 1971; Thomson, 1968; and Wetherbee, 1969). These have greatly broadened our knowledge of the morphological and chemical variations in this group and of the distribution and ecology of the segregates. One of these segregates, hitherto unnamed, is characterized by the presence of protolichesterinic acid. This variant was mentioned, without formal taxonomic treatment, by Ahti (1966, p. 387) who suggested that the two specimens he saw could possibly belong to *Cladonia fimbriata* agg. For a number of years this writer has been aware of this chemical variant and has been accumulating material with the intention of obtaining information on its geographical distribution. It does appear to have a definite western North American distribution pattern, a definite chemistry, and a quite recognizable morphology, hence it seems timely to recognize it on a par with a number of other segregates in the *C. chlorophaea* complex such as *C. cryptochlorophaea* which contains cryptochlorophaeic acid, *C. merochlorophaea* with merochlorophaeic acid plus 4-0-Methylcryptochlorophaeic acid, *C. grayi* with grayanic acid, *C. conista* with substance H, *C. conistea* with atranorin, and *C. perlomera* with perlatolic, merochlorophaeic and 4-0-Methylcryptochlorophaeic acids. *C. subconistea* of Japan contains psoromic acid and fumarprotocetraric acid ± atranorin, *C. imbricaria* contains imbricaric acid and is known from Iceland and Wyoming. Additional unnamed chemical variants include the specimens formerly thought to be *C. merochlorophaea* but which contain only "novochlorophaeic acid" which Cul-

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berson & Kristinsson (1969) showed was actually a mixture of sekikaic and homosekikaic acids which cocrystallized. Specimens containing rangiformic acid from Alaska and Europe, and Icelandic specimens containing homosekikaic and fumarprotocetraric acids have been discussed by Culberson & Kristinsson (1969).

The presence of protolichesterinic acid is not common in *Cladonia*. *Pycnothelia papillaria*, formerly in *Cladonia*, contains this fatty acid. *Cladonia formosana* Asah. (correctly *C. subpityrea* Sandst.) contains this acid but also psoromic acid ± usnic acid and a quite different morphology. *Gymnoderma lineare* (Evans) Yoshimura and Sharp (*Cladonia linearis* Evans) contains protolichesterinic acid along with atranorin.

Cladonia asahinae sp. nov.

Podetia cyathiformia, usque ad 1 cm alta, superiae partes sensim accrescentes, bases corticatae usque ad partem latam, superiora grosse sorediata et schizidiata, decorticata, opaca, alba usque ad fusca, interior sorediata et schizidiata; apothecia fusca stipata. Plantae acidum protolichesterinicum et acidum fumarprotocetraricum continentes.

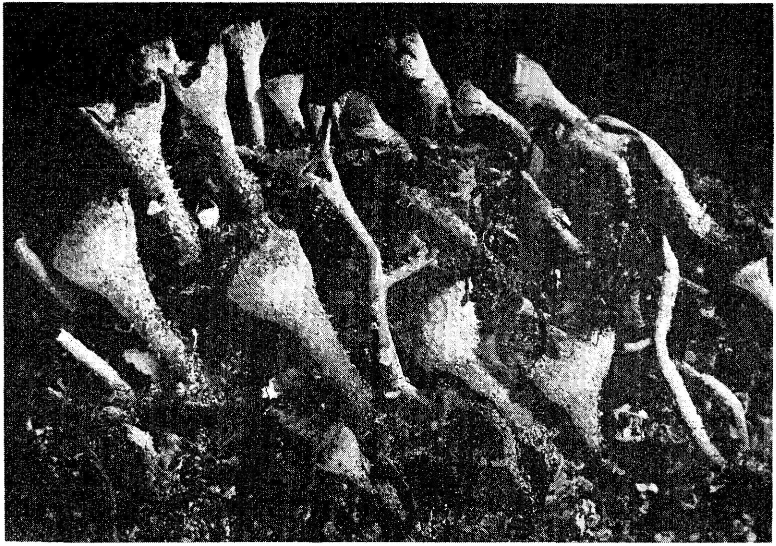

Fig. 1. A portion of the type specimen of *Cladonia asahinae*.

Primary squamules 1-2 mm broad, rounded, ascending, olive green above, white to blackening below, sorediate or esorediate. Podetia cup-forming, the cups 0.8-1.0 cm tall, gradually flaring in the upper half, giving the shape of *C. fimbriata* rather than the more squat appearance of *C. chlorophaea*, the base of the stalk corticate to the flare but with squamules and schizidia common, the upper part with a mixture of coarse soredia (0.1-0.2 mm) and schizidia to 0.4 mm broad, the upper part becoming decorticate, dull, white to browning, the interior of the cup covered with a mixture of coarse soredia and schizidia. Apothecia on short stipes from the margins of the cups, brown. Sometimes with secondary cups proliferating on the margins of the primary. Reactions: K−, C−, P+ red.

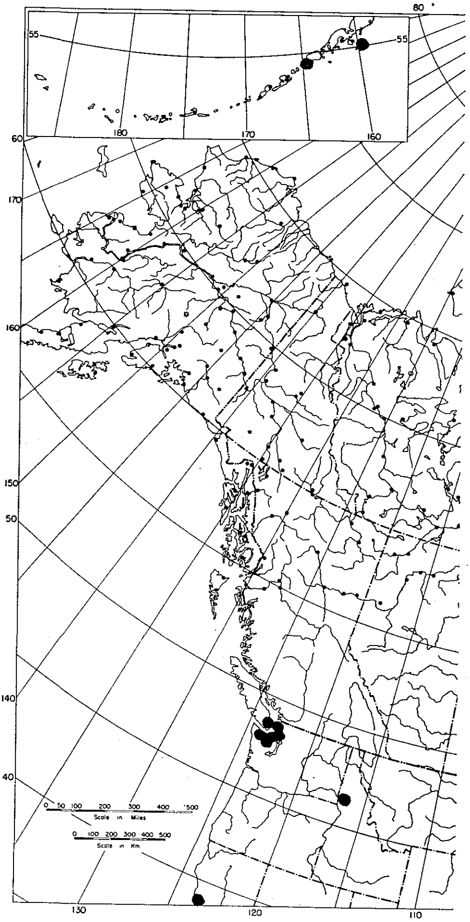

Fig. 2. The distribution of *Cladonia asahinae*.

Contents: protolichesterinic acid (as tested in GE solution) and fumarprotocetraric acid in all specimens seen.

Typus: Fig. 1. U. S. A., Washington State, Skagit Co., Mt. Erie on Fidalgo Island S. of Anacortes, on humus on west side of hillslope, Aug. 19, 1969, J. W. Thomson 16296 (WIS), on excursion of XI International Botanical Congress.

Other specimens seen: Washington, Clallam Co., Sequim, Thomson 15231: ibid, along Elwha River, Thomson 15173; ibid, Dungeness, Thomson 15086; California: Marin Co., 4.6 mi S of Olema, 1961, P.C. Hutchison 874; Idaho: Latah Co., Little Boulder Creek, 1969, D. Anderegg 66; Alaska: Cold Bay, Alaskan Peninsula, 1976, Clarita Neher s. n.; Big Koniuji Island in Shumagin Islands, 1976, Clarita Neher s. n. In addition to these Ahti (1966) has cited two specimens from British Columbia at Victoria and on Mayne Island which are also placed on the map (Fig. 2).

Although there appears a considerable disjunction between the specimens from Alaska and those from southern British Columbia and the Washington State area, this is undoubtedly only an artifact of the scantiness of available specimens. This species appears to have a Pacific Coastal distribution pattern with an outlier in Idaho.

In ecology this species appears to prefer soils very high in humus, over soil, over rocks, or old logs and tree bases. The Alaskan specimens were very near heavily populated bird colonies but on thick humus. Associated lichens in the packets include *Cladonia deformis*, *C. cornuta*, *C. furcata*, and *C. macilenta*.

Although this species does have some schizidia, its abundance of coarse soredia places it closer to *C. chlorophaea* than to *C. pyxidata*. The soredia are not farinose enough to place this with *C. fimbriata* and the cups flare more gradually than in that species although there is a close resemblance in that they have taller stalks than *C. chlorophaea* usually has. The color of the podetia varies from a yellowish tint of green to more usually a very slaty gray which reminds one of *C. merochlorophaea*. While these are all tendencies, as Ahti suggests occur in this group, the species does have a characteristic appearance which makes one suspect in the field that it may be different from the other members of the *C. chlorophaea* group.

As discovery and delimitation of this species has depended on the chemotaxonomic principles developed by Dr. Asahsna, it seems appropriate to name for him a species in a genus to which he contributed so much.

I thank Katherine Snell for assistance with the Latin and Gene Coffman for the photograph.

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ジョウゴゴケ (*Cladonia chlorophaea*) 群についてはすでに多くの論文が発表され，この群の形態的あるいは化学的な変異および各種の分布や生態についてよく調査されているが，この群に属し，ハナゴケ属には珍らしいプロトリケステリン酸を含むものを新種 *C. asahinae* として報告した。本種の子柄は基部の柄の部分でジョウゴゴケよりやや長く，盃も徐々に開いているので，むしろ *C. fimbriata* に似た印象を与える。しかし，粉芽が *C. fimbriata* の場合のように微粒状でなくやや粗い点は，やはりジョウゴゴケに近縁であることを示している。こうした形態上の特徴だけで，本種をジョウゴゴケ群の他種から確実に区別することはやや困難ではあるが，野外では後者と違ったものであると期待させるには充分である。本種はカナダを含む北米西部太平洋岸とアラスカに分布し太平洋沿岸分布型を示す。